

Before the  
**Federal Communications Commission**  
Washington, D.C. 20554

In the matter of  
  
IP-Enabled Services

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WC Docket No. 04-36

**Comments of Cox Communications, Inc.**

To-Quyen T. Truong  
J.G. Harrington

Its Attorneys

Dow, Lohnes & Albertson, P.L.L.C.  
1200 New Hampshire Avenue, N.W.  
Suite 800  
Washington, D.C. 20036  
(202) 776-2000

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## **SUMMARY**

As one of the pioneering and most successful facilities-based providers of competitive local telephone services, Cox views the advent of voice over IP services with great enthusiasm. Not only will the deployment of new VoIP services introduce much-needed competition into traditional local telephone markets, but these services also will provide American consumers with a rich diversity of advanced features and functionalities that will greatly enhance their existing communications options.

As a CLEC serving more than one million residential local telephone customers, Cox has extensive operational experience offering circuit-switched service and transitioning to VoIP technology. This real-world experience provides valuable insights into the type of regulatory framework that the Commission should develop for VoIP services, as well as the specific regulatory issues to which the Commission should turn its immediate attention.

*First*, the Commission should begin by embracing certain overarching policies to guide its implementation of a regulatory framework for competitive VoIP services. These include (1) applying a “light touch” regulatory regime to voice over IP services; (2) harmonizing the regulation of all competitive providers in the telephone marketplace; and (3) ensuring that Commission rules affirmatively protect and promote facilities-based VoIP services. Each of these goals must be pursued if the Commission is to create a regulatory environment that is fair to all voice service providers and that preserves critical incentives to invest in the advanced communications networks that make VoIP services and applications possible.

*Second*, the Commission should clearly delineate which VoIP providers will be subject to FCC regulation, and what rights and obligations that regulation will encompass. In particular, the Commission should immediately implement rules for VoIP providers who offer services

meeting each prong of a four-part test: (1) The service uses North American Numbering Plan resources; (2) The service can receive calls from or terminate calls to the public switched telephone network; (3) The service is a plausible replacement for traditional telephone service; and (4) The service uses IP transmission between the service provider and the end user. VoIP services satisfying these criteria hold the greatest promise for jumpstarting, on a widespread basis, the very telephone competition that Congress envisioned when enacting the 1996 Act, and accordingly should be addressed immediately.

*Third*, the Commission should take all steps necessary to ensure that all VoIP service providers meeting the four-pronged test are able to enjoy certain rights – regardless of whether their service is an information or a telecommunications service, or inter- or intrastate. These include LEC regulatory rights, such as interconnection and access to telephone numbers; mechanisms for speedy resolution of disputes and network malfunctions; minimal economic regulation; and symmetrical, light taxation. By the same token, providers satisfying the test also should meet certain regulatory obligations, including addressing law enforcement needs; providing access to E911; making service available to disabled customers; and contributing to universal service. VoIP services will compete in the telephony market, but cannot do so effectively without these basic rights and obligations. Accordingly, while service classification and the regulatory regime that attaches to such classification normally are important, voice over IP services present a unique need for the Commission to develop a special regulatory framework to ensure that all telephony providers are able to compete effectively, regardless of their classification.

Although this framework must be adopted by the Commission, it also should include enforcement and dispute resolution at the state level. The states are much better suited than the

Commission to addressing many of the implementation issues that arise in the provision of competitive telephone service, and generally have fulfilled this role well since the enactment of the 1996 Act. At the same time, the Commission should preempt state regulation that imposes more obligations on traditional CLECs than the national regime. Maintaining costly existing state regulatory requirements for CLECs, such as service quality standards and tariffing, could impose a severe competitive disadvantage on those new entrants who made the risk investments necessary to bring early competition to the market.

The Commission has ample tools at its disposal to adopt the framework proposed by Cox. Taken together, the Commission's ancillary jurisdiction under Section 4(i) to adopt rules to fulfill its Title II statutory responsibilities; its power under Section 10 to forbear from unnecessary regulation; its specific powers to ensure interconnection and non-discriminatory treatment under Sections 201 and 202; its obligation to ensure the development of Internet-based services under Section 230; and its interconnection authority under Section 251 provide the powers necessary to develop a uniform regulatory regime for competitive providers of telephony services.

The Commission should exercise its authority expeditiously to establish the basic rights and obligations needed for voice over IP service providers to operate effectively in the market and to meet core public interest needs. While the task of creating a new regulatory regime presents great challenges, rather than becoming paralyzed in an effort to resolve all the issues at once, the Commission can and must focus on its central goals and promptly issue the basic rules needed to arm and guide VoIP providers' entry into the market. Through such quick action, the Commission at last can fulfill the promise of the 1996 Act to bring forth a new age in telephone competition.

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Cox Communications, Inc. (“Cox”), by its attorneys, hereby submits its comments in response to the Commission’s *Notice* in the above-referenced proceeding.<sup>1</sup>

**I. Introduction**

This is a critical moment in the development of voice over Internet Protocol (“voice over IP” or “VoIP”) services. As Cox has noted with enthusiasm in its second white paper on the subject of IP-Enabled Services, voice over IP is ready for prime time; voice over IP network facilities now can be deployed at considerable savings compared to circuit-switched telephony; and voice over IP will cause a rich evolution of new customer-friendly functionalities to emerge.<sup>2</sup>

Packet switching, Internet Protocol and SIP are not services; they are technologies and standard protocols. Use of those technologies and protocols does not in and of itself affect the nature of the particular services they support any more than the choice of digital or analog transmission, twisted pairs of copper wire or hybrid fiber-coax, or the choice of a star or ring topology. Yet IP technology will open the door to greater innovation and competition, and Cox applauds the Commission for its commitment to adopt a framework that will regulate IP-enabled

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<sup>1</sup> IP-Enabled Services, *Notice of Proposed Rulemaking*, WC Docket No. 04-36, FCC 04-28, rel. Mar. 10, 2004 (the “*Notice*”).

<sup>2</sup> See *Voice over Internet Protocol: Ready for Prime Time*, May 12, 2004 (“*Cox White Paper*”). A copy of this white paper is attached to these comments as Exhibit 1.

services with a light touch to encourage such innovation and take account of such competition. Because voice over IP services will compete in the telephony market, these services present a unique need for the Commission to develop a new regulatory regime that will ensure no competitive provider is disadvantaged in that market. This proceeding is a rare opportunity for the Commission to rationalize its rules in this area to the benefit of American consumers.

Providers using IP technology to offer voice services will utilize a variety of different network configurations, and they will compete and connect with a variety of incumbent and competitive service providers that today utilize circuit-switched technology. The Commission should not become bogged down at this time in arcane debates regarding whether a particular service is a telecommunications service or an information service, interstate or intrastate. Focusing on the issues in this way would keep the Commission mired in unnecessary complexity and controversy, at a time when it needs to act quickly to provide the market with certainty. The Commission should focus instead on the creation of a uniform regulatory framework for all competitive telephony service providers. To ensure a consistent, certain regulatory environment, the Commission should act swiftly to address the core issues affecting these new technologies and their relationship to existing ways of providing services.

While the Commission had to build from scratch in 1996, it now has the benefit of nearly a decade of experience in implementing the Telecommunications Act. In the words of Santayana, "those who cannot remember the past are condemned to repeat it." In 1996, the Commission decided not to draft its implementing rules to place any special emphasis on encouraging facilities-based competition, because it did not consider that form of competition to be any more valuable to consumers than UNE-P (unbundled network element platform) or

resale.<sup>3</sup> Today, the Commission is well aware that it must adopt rules consistent with its conclusion that facilities-based competition is most likely to maximize consumer benefits in the long run.<sup>4</sup>

Both Congress and the Commission have recognized that telecommunications facilities are highly capital-intensive to deploy and maintain. Moreover, even non-facilities-based competitors cannot flourish if network owners lack the incentives to invest in the underlying infrastructure. Accordingly, the regulatory framework that the Commission adopts must not disadvantage facilities-based competitive providers by imposing on them any regulations or burdens beyond those placed on their non-facilities-based competitors. In addition, experience with competitive local exchange carriers' ("CLECs") struggles to break into the market shows that the Commission must adopt certain basic rules to (a) entitle VoIP providers to the critical functionalities and interconnection necessary to compete in the telephony market and (b) give them the ability to obtain prompt resolution of disputes at the state level.

Perhaps no other commenter has had as much real world experience and success as Cox has had in providing new facilities-based competitive residential and business telephony services to the American public. In light of this experience, these comments spell out the minimal rules needed to enable voice over IP to prosper and to preserve important social goals. Time is of the essence for the Commission to establish the pillars for this "light touch" regulatory regime, because VoIP no longer is a gleam in its progenitor's eye. It is a marketplace reality.

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<sup>3</sup> Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, *First Report and Order*, 11 FCC Rcd 15499, 15509 (1996) (*First Local Competition Order*).

<sup>4</sup> Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, *Third Report and Order and Fourth Further Notice of Proposed Rulemaking*, 15 FCC Rcd 3696, 3704 (1999) ("*UNE Remand Order*"); Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, *Report and Order and Order on Remand and Further Notice of Proposed Rulemaking*, 18 FCC Rcd 16978, 17025 n. 233 (2003) ("*Triennial Review Order*"), *rev'd in part United States Tel. Assn. v. FCC*, 359 F.3d 554 (D.C. Cir. 2004).



**II. Cox Is in a Unique Position to Provide Comments About IP-Enabled Services.**

Since the enactment of the 1996 Act, there are few companies that have devoted as many resources to developing and providing new and advanced services as Cox. Even fewer have been as successful in offering those services. This ongoing commitment to deploying new facilities-based services gives Cox a perspective that is unavailable to most other companies in the industry, and that has particular relevance as the Commission considers the regulatory model to apply to IP-enabled services.

Since the mid-1990s, Cox has invested more than \$12 billion to upgrade its cable networks to permit it to offer new and advanced services. As a consequence of these investments, more than 97 percent of Cox's networks can carry two-way communications, including Cox High Speed Internet service, circuit-switched telephony and voice over IP services. These expenditures allowed Cox to be one of the pioneers in offering both broadband service and circuit-switched telephony. Cox now has nearly eight years of experience providing telephone service to real customers through its own facilities. Cox currently offers telephone service to more than 40 percent of the homes passed by Cox cable systems, and that percentage will continue to grow as Cox brings both circuit-switched and voice over IP services to new markets.<sup>5</sup>

Cox's outside plant, switching and nationwide high-speed backbone carry both local and long distance traffic. Over one million people receive their local phone service from Cox Digital

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<sup>5</sup> In fact, Cox is in the process of launching its newest circuit-switched market, Fairfax County, Virginia, and anticipates making phone service available throughout the Fairfax system through the rest of the year and early 2005. As described below, in December 2003, Cox launched its first commercial voice over IP service in Roanoke, Virginia.

Telephone, which provides a direct substitute for ILEC primary line services and is provided over Cox's own state-of-the-art broadband networks.<sup>6</sup>

As it has for all of its other services, Cox designs its telephone service for quality and reliability. Cox has engineered its networks, whether they use circuit-switched or IP-based technologies, to meet or exceed industry reliability and quality standards. In fact, Cox's residential local telephone service received the highest rating – beating SBC and Qwest, among others – in the J.D. Power and Associates Residential Local Telephone Customer Satisfaction Study for the Western Region in 2003, which was the first year Cox was large enough to qualify for consideration.<sup>7</sup>

Although Cox's pioneering efforts focused initially on circuit-switched service, Cox launched its first voice over IP service in the Roanoke, Virginia market in December, 2003. Cox customers in Roanoke purchase a service that already offers all the functionalities provided by the circuit-switched service that Cox offers in a dozen other markets. Indeed, the take rate for this service is nearly the same as the take rate in Cox's circuit-switched markets. Cox Digital Telephone customers in Roanoke have full E911 capability and access to their long distance carriers of choice. Their customer premises equipment incorporates a battery backup in case of power outages that provides four hours of "talk time" and up to twelve hours of standby time, and Cox's disclosures and marketing materials explain what customers should do in the case of power outages. Cox anticipates launching voice over IP service in several additional markets by the end of 2004.

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<sup>6</sup> In certain areas, Cox uses the ILEC inside wire subloop in MTE environments where the inside wire demarcation point is not at the minimum point of entry.

<sup>7</sup> J.D. Power and Associates Power Circle Ratings, available at [www.jdpower.com/cc/telecom/jdpa\\_ratings/local/Find.jsp?s=2&v2=6](http://www.jdpower.com/cc/telecom/jdpa_ratings/local/Find.jsp?s=2&v2=6); Press Release, Cox Communications, Cox Digital Telephone Receives J.D. Power and Associates' Highest Honor in Local Telephone Customer Satisfaction (July 21, 2003), available at [www.cox.com/sandiego/telephone/jdpower.asp](http://www.cox.com/sandiego/telephone/jdpower.asp).

From an intercarrier and regulatory perspective, Cox treats its voice over IP service the same as its circuit-switched service in Virginia. Cox interconnects and exchanges traffic directly with Verizon under the terms of its arbitrated interconnections agreements in Virginia; inputs its customers' 911 information into the Verizon 911 database; orders and manages its numbering inventory through NANPA; and uses its existing back office operations to interact with Verizon for number portability and directory listings. Pending the FCC's determination of the proper regulatory treatment of voice over IP services, Cox also complies with all Virginia State Corporation Commission requirements for CLECs, including tariffing.

Cox's voice over IP offering, like its circuit-switched offerings, is entirely facilities-based. Traffic from Cox customers in Roanoke does not touch the public Internet, but instead traverses Cox's own managed IP networks and backbone until it is terminated to another Cox Digital Telephone customer or is sent to the public switched telephone network ("PSTN") in standard formats and via standard interconnection or switched access arrangements. Using its own facilities allows Cox to prioritize its voice packets and to offer service quality comparable to circuit-switched voice service. Moreover, Cox voice over IP customers are not required to purchase cable modem service to get voice service: They can buy it separately or in combination with any of the other services Cox offers. For customers who do not want broadband Internet access, this represents a significant saving over voice over IP services offered by AT&T, Vonage and others.

Cox's IP network architecture also will increase reliability. For instance, Cox's three soft switches, once deployed, will be able to back each other up in the case of outages. This is a functionality that is not available in traditional circuit-switched networks, but that is made possible by a packet-switched architecture.

While Cox expects that it will continue to offer its voice over IP service as a replacement for POTS, it also plans to roll out new services and functionalities as the technology and market demands develop. As described in its white paper, Cox is very enthusiastic about the potential for IP-based offerings to meet customer needs and desires.<sup>8</sup> In particular, Cox expects to take advantage of the ability of IP technology to deliver all of the packets associated with a customer's services to any connection at the customer's premises – a phone, a computer or a set-top box connected to a television, or all of them at the same time. This will permit Cox to introduce a wide range of services and functionalities, potentially including video transmission, document transmission and display, the ability to screen calls, a virtual “do not disturb” sign and the ability to have voice messages delivered to an e-mail or web browser interface accessible from anywhere or any device with Internet access. One other advantage of IP-based technologies is that they will increase Cox's ability to adapt its services to individual customer needs, a promise that circuit-switched technologies such as AIN have been unable to fulfill. In the future, for instance, Cox voice over IP customers may be able to add, delete, change and manage their voice over IP services directly, and to activate and deactivate features and functions as they desire.

Cox is thus enthusiastic about realizing the full promise of VoIP at the same time that it builds on its extensive circuit-switched residential and business services. Cox's substantial experience providing competitive telephone service, both circuit-switched and IP-based, gives the company valuable perspective on how the Commission should approach this proceeding.

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<sup>8</sup> See *Cox White Paper*, Exhibit 1 at 4-5.

### **III. The Commission Should Not Stray from Its Conclusion that Facilities-Based Competition Provides the Greatest Consumer Benefits.**

In 1996, facilities-based service, UNE-P and resale were all declared valid and viable ways for competitors to enter the local telephone service marketplace, and the Commission declined to adopt rules that would favor facilities-based competition.<sup>9</sup> Three years later, the Commission recognized that this declaration was in error, determined that significant benefits created by facilities-based competition were unavailable from UNEs and resale and concluded that use of UNEs, in particular, should be viewed as part of a transition to the provision of facilities-based service.<sup>10</sup>

In that three year span, the Commission learned that facilities-based competition is better for consumers of telecommunications services. Facilities-based competitors have a greater ability to meet customer needs and to maintain the quality of their services. Facilities-based competitors are not at the mercy of other carriers to provide their services, and there is nothing a reseller or UNE-P carrier can do that a facilities-based carrier cannot. Facilities-based competition also increases the likelihood that consumers will get the best price, better bundles and advanced services like high speed Internet access.

These conclusions also have been confirmed by the experience of telephone industry participants since the *UNE Remand Order*. As the Commission explained in the *Triennial Review Order*:

Facilities-based competition better serves the goal of deregulation because it permits new entrants to rely less on incumbent LECs' facilities and on regulated terms for access and price. And it serves the goal of innovation because new facilities are more likely to have additional capabilities to provide new services to consumers and competitors' deployment of new facilities is likely to encourage incumbents to invest in their own networks.<sup>11</sup>

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<sup>9</sup> *First Local Competition Order*, 11 FCC Rcd at 15509.

<sup>10</sup> *UNE Remand Order*, 15 FCC Rcd at 3704.

<sup>11</sup> *Triennial Review Order*, 18 FCC Rcd at 17025 n. 233.

The Commission cannot afford to stray from its fundamental – and accurate – conclusion that facilities-based services create the most significant and lasting consumer benefits. Both Congress and the Commission have recognized that telecommunications facilities are highly capital-intensive to deploy and maintain. This is true regardless of the technology. Just as the advent of digital switching enabled new features like caller ID and call waiting, IP-enabled services can and will support a wide array of new features and functionalities that will benefit consumers greatly. But the Commission must not forget that such new functionalities cannot emerge and prosper in the absence of investment in the underlying infrastructure.

Consequently, the Commission should make every effort to protect and promote facilities-based competition when designing a regulatory framework for IP-enabled services. At a minimum, the Commission should make sure that it does not limit the obligations of non-facilities based providers without granting parallel relief to providers who have risked billions in facilities investment. And the Commission certainly should not impose on facilities-based competitive providers additional costs in the form of new obligations and restrictions designed to advance the interests of those competitors who want to ride on these facilities without making the requisite infrastructure investments.

**IV. The Commission Must Focus on Fundamental Regulatory Issues and Act Quickly on Them.**

The Commission's goals in this proceeding, while not modest, must be focused. An effort to address every issue immediately is likely to result in delays when certain and quick decisions are essential to the development of a functioning voice over IP marketplace.

Consequently, the Commission should focus on the core regulatory rights and obligations that should apply to IP-based services that substitute for traditional telephone service, in order to get these services quickly to market and provide new telephony competition. That focus will enable

the Commission to act promptly to limit the uncertainty that even now is affecting providers of IP-based services. Regulatory uncertainty is undesirable for many reasons, not the least of which is its adverse effect on investment.

**A. Prompt Action Is Necessary to Ensure Smooth Deployment of New IP-Enabled Services to American Consumers.**

While developing an appropriate framework is critical, time also is of the essence. Today, even with the guidance provided in recent Commission decisions, providers of IP-enabled services often are making decisions about how to treat their services in a regulatory vacuum. Unsurprisingly, they are reaching widely varying conclusions. Given the breakneck pace at which providers are developing and deploying these services, the Commission should act quickly to resolve the uncertainty surrounding the regulatory status of voice over IP services. The only way to avoid unnecessary difficulties in the marketplace for providers and consumers alike is for the Commission to act promptly to spell out the core rights and obligations of VoIP providers and to harmonize regulation of all competitive providers of telephony services whenever possible.

Prompt action also reduces the possibility that the Commission will find itself in the difficult position of having to defend its actions after the courts already have begun to speak. Only the Commission has the statutory mandate and expertise needed to develop a regulatory framework that can adequately address the novel regulatory and technical issues presented by new, rapidly evolving IP-enabled services. As the expert agency, the Commission's views should be entitled to deference, but courts may be less inclined to give that deference when they already have addressed an issue themselves.<sup>12</sup> Likewise, the states may forge ahead with their own rules during the pendency of the Commission's proceeding. States throughout the nation

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<sup>12</sup> *Brand X Internet Services v. FCC*, 345 F.3d 1120, 1131-32 (9th Cir. 2003).

might adopt a patchwork of potentially inconsistent or conflicting regulations that would impose prohibitive compliance difficulties and costs on VoIP service providers, particularly given these providers' centralized operations.<sup>13</sup> In light of the national importance of the issues raised in this proceeding, it is essential for the Commission, acting forthrightly as the expert agency, and not courts in twelve circuits or legislators and agencies in fifty states, to decide how those regulatory issues should be addressed.

While prompt action is critical, the Commission need not and should not decide every issue at once. Trying to address every issue simultaneously will lead only to delay and more uncertainty. To avoid that possibility, the Commission should focus first on ensuring that voice over IP providers that compete in the telephony market have clearly defined rights and obligations with regard to the core issues described below, such as interconnection, E911 and universal service. The Commission then can address the other issues raised by IP-enabled services separately.<sup>14</sup> Only by giving priority to the regulatory issues that demand immediate resolution can the Commission provide appropriate guidance swiftly and affirmatively promote the introduction of robust competition into local telephone markets and the development of new, competitive IP-enabled services.

**B. The Commission Should Issue Rules as Promptly as Possible to Provide the Critical Functions and Interconnection Needed for VoIP Services to Compete as True Replacements for Traditional Telephone Service.**

Over its eight years of experience developing, deploying and offering fully facilities-based services, Cox has developed a detailed understanding of what must be done to provide a

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<sup>13</sup> See, e.g., Complaint of Frontier Telephone of Rochester, Inc. Against Vonage Holdings Corp. Concerning Provision of Local Exchange and InterExchange Telephone Service in New York State in Violation of the Public Service Law, *Order Establishing Balanced Regulatory Framework for Vonage Holdings Corp.*, Case 03-C-1285, rel. May 21, 2004; Public Utilities Commission of California, *Order Instituting Investigation*, I0402007, rel. Feb. 11, 2004.

<sup>14</sup> For instance, the Commission need not resolve broad intercarrier compensation issues to address the basic questions described above.



high-quality, customer-friendly, feature-rich telephone service. This experience has shown that voice over IP providers that hope to compete with incumbents in offering primary lines must operate in a regime with specific characteristics, particularly if they hope to offer services that compete on price and functionality. These characteristics include:

- LEC regulatory rights, including interconnection with other carriers and collocation for that purpose, access to telephone numbers and local number portability, access to the facilities and resources necessary to provide E911 services, directory listings and published directory distribution, intercarrier compensation and access to universal service fund support;
- Mechanisms for speedy resolution of intercarrier and customer disputes and resolution of network problems that affect efficiency or quality of the exchange of traffic among all service providers;
- Little, if any economic regulation;
- Symmetrical, light taxation (such as consistent application of the federal excise tax); and
- Consistent, lighter regulation of new phone offerings, regardless of the technology used.

Symmetry of regulation for competitive telephony providers is particularly important.

For example, lack of interconnection would result in the complete inability of a voice over IP service provider to deliver calls to or receive calls from subscribers of the incumbent carrier and other providers. If the Commission wanted to emulate its approach to wireless regulation, it could forbear from requiring competitive providers – whether they use circuit-switched or IP technology – to provide equal access, thereby applying a consistent, rational policy to all these competitors in the telephone marketplace. Similarly, the Commission should evaluate the application of the Customer Proprietary Network Information (CPNI) rules to voice over IP services and determine how to address customer privacy issues across all services and technologies.

In the same vein, a uniform set of basic obligations should apply to all competitive providers of telephony services in order to meet core public interest needs. Cox commits that, as a voice over IP provider, it will cooperate with law enforcement requests, provide customers

with access to 911/E911 capabilities and make services available to disabled customers, just as it does in markets where its service is provided via circuit-switched technology. All providers who use IP technology to offer telephony service should be required to explain with clarity the availability of these functions and customer protections to consumers in their marketing materials and other customer disclosures. In addition, in return for access to universal service support, including Lifeline and LinkUp, and the right to apply for eligible telecommunications carrier status, Cox is willing to contribute to the universal service fund for its voice over IP services, on a per line or per number basis.

It is particularly important to apply regulatory obligations, both financial and operational, in an even-handed way to prevent market distortion through regulatory arbitrage. For instance, there should not be an opportunity for a non-facilities-based provider to limit its universal service obligations because of the way it provides a telephony service. The Commission also should not impose greater restrictions and costs on facilities-based providers and create new entitlements and advantages for providers that are unwilling to make the capital investments necessary to serve their customers directly through their own facilities. Otherwise, competitive providers will lose the incentive to invest the millions and billions of dollars necessary to deploy, maintain and upgrade the underlying facilities, and the short term benefits to the favored providers would be at the expense of both the industry and consumers in the long run.

**C. The Commission Should Adopt a Framework that Includes Speedy Enforcement and Dispute Resolution at the State Level.**

Enforcement and dispute resolution are important elements of any regulatory regime. Without access to speedy enforcement and dispute resolution, competitive service providers will find their actions stymied by incumbent intransigence and delays. In Cox's experience, the states can best resolve many of the implementation and technical issues that arise as alternative

telephone services are brought to market and are established as viable competitors. The Commission, with its many obligations, limited resources and geographic isolation, is less suited to this role. Consequently, the regulatory framework adopted by the Commission should ensure that the states have a central role in dispute resolution and enforcement, even if state jurisdiction does not extend to substantive regulation of providers of IP-enabled voice services.

The last eight years have demonstrated that the Commission is not in a position to substitute its enforcement and dispute resolution capabilities for those of the states, if for no other reason than that the staff and the Commissioners have too many other responsibilities. Cox, for instance, has been involved in two intercarrier disputes that were heard by the Commission instead of a state regulator, a complaint concerning reciprocal compensation and the arbitration of an interconnection agreement. The complaint proceeding was bifurcated into liability and damages phases, took two and a half years to resolve and ended only because the parties settled.<sup>15</sup> The arbitration proceeding took twenty months from the time of Cox's initial filing to resolve non-cost issues, another twelve months to resolve cost issues raised by other parties, and still is subject to pending requests for reconsideration.<sup>16</sup> It is not just Cox, of course,

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<sup>15</sup> Cox Virginia Telcom, Inc. v. Verizon South Inc., *Complaint*, File No. EB-01-MD-006 (Filed Mar. 9, 2001); Cox Virginia Telcom, Inc. v. Verizon South Inc., *Memorandum Opinion and Order*, 17 FCC Rcd 8540 (2002); Cox Virginia Telcom, Inc. v. Verizon South Inc., *Order*, 18 FCC Rcd 1597 (Enf. Bur. 2003).

<sup>16</sup> Pleading Cycle Established for Comments on Cox Virginia Telcom, Inc.'s Petition for Preemption of the Jurisdiction of the Virginia State Corporation Commission Regarding Interconnection Disputes with GTE South Inc., *Public Notice*, 15 FCC Rcd 12703 (Comm. Carr. Bur. 2000) (noting the filing of Cox Petition on June 30, 2000); Petitions of WorldCom, Inc., Cox Virginia Telcom, Inc., and AT&T Communications of Virginia, Inc. Pursuant to Section 252(c)(5) of the Communications Act for Preemption of the Jurisdiction of the Virginia State Corporation Commission, *Memorandum Opinion and Order*, 17 FCC Rcd 27039 (Wireline Comp. Bur. 2002) (resolving non-cost issues presented in arbitration proceeding); Petition of WorldCom, Inc. Pursuant to Section 252(c)(5) of the Communications Act for Preemption of the Jurisdiction of the Virginia State Corporation Commission Regarding Interconnection Disputes with Verizon Virginia Inc., and for Expedited Arbitration, *Memorandum Opinion and Order*, 18 FCC Rcd 17222 (Wireline Comp. Bur. 2003) (resolving cost issues in arbitration proceeding); Petitions of WorldCom, Cox Virginia Telcom, Inc., and AT&T Communications of Virginia, Inc. Pursuant to Section 252(c)(5) of the Communications Act for Preemption of the Jurisdiction of the Virginia State Corporation Commission, *Order on Reconsideration*, CC Docket Nos. 00-218, 00-249, 00-251, DA 04-1276, 2004 FCC LEXIS 2505, n.2, rel. May 14, 2004 (resolving one petition for reconsideration and noting several others that remain pending).

that has been subject to long delays in enforcement and dispute resolution: A complaint similar to Cox's reciprocal compensation complaint settled in November, 2003, almost exactly three years after it was filed.<sup>17</sup>

These delays resulted not from an unwillingness to act, but from the Commission's need to allocate its scarce resources. Absent an unprecedented increase in the size of the Commission's staff, it is difficult to imagine how the Commission could begin to address the number of complaints and disputes that would be brought before it if there were no state-level alternative for providers of IP-enabled voice services. The Commission, at a minimum, would be forced to hire a corps of new administrative law judges to arbitrate interconnection disputes, and even that would not permit the agency to address the day-to-day complaints and disputes that state regulators handle routinely. Simply put, there is no rational mechanism for the Commission to take on the mediation, arbitration, dispute resolution and enforcement role that the states have had since the enactment of the 1996 Act.

The solution, therefore, is to maintain a state role in dispute resolution and enforcement to the maximum extent possible. The particular areas where state involvement is most appropriate include the following:

- Intercarrier arbitration and dispute resolution;
- Consumer complaints, acting within guidelines provided by the Commission as to the scope of authority and permissible enforcement actions;
- Public safety, particularly including 911 access;
- Consumer education for the transition to a more competitive environment; and
- Network problems that affect the efficiency or quality of the exchange of traffic between service providers.

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<sup>17</sup> See *Starpower Communications, LLC v. Verizon South Inc.*, Order, EB File No. 00-MD-19, rel. Apr. 21, 2004 (denying request to vacate damages order in light of settlement).

While Cox's experiences in the states vary, in general Cox has found that the states are committed to fulfilling their obligations to carriers and consumers alike. Cox has had many positive experiences with state regulators. These include prompt assistance in alleviating trunk blocking problems with the incumbent carriers in California and Virginia, addressing inappropriate unbundling requests in Arizona, assisting with directory problems in California and Virginia and obtaining access to building wiring in Nebraska and California. In several areas, state commission assistance in improving number portability performance by ILECs has been vital to new competitors as they win customers from incumbents. Similar issues are likely to arise with IP enabled voice services. State regulators are particularly suited to addressing the types of issues listed above because they have longstanding experience in these areas and because they are more connected to local concerns and needs. Given that many of these issues are intrinsically local in nature, it plainly is most reasonable for state regulators to resolve them, with appropriate Commission oversight. In short, while the Commission should establish the national regulatory framework for IP-enabled voice services, the states have an important implementing role to play in ensuring speedy enforcement and dispute resolution under those rules.

**V. The Commission Should Establish a Regulatory Framework that Avoids Market Distortions, Regulatory Arbitrage and Inconsistent Customer Experiences.**

In the past, a service provider's ability to enjoy certain regulatory benefits has turned on two legal questions: (1) Does it offer "telecommunications service" or "information service"? and (2) Is the service "interstate" or "intrastate"?<sup>18</sup> The range and ever-changing nature of IP-

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<sup>18</sup> See, e.g., Federal-State Joint Board on Universal Service, *Report to Congress*, 13 FCC Rcd 11501 (1998); Federal-State Joint Board on Universal Service, *Order on Remand*, 16 FCC Rcd 571 (2000) (eligibility for universal service funds based on classification as a telecommunications carrier); MTS and WATS Market Structure Amendment of Part 36 of the Commission's Rules and Establishment of a Joint Board, *Decision and Order*, 4 FCC Rcd 5660 (1989) (regulatory treatment of private line service dependent on interstate or intrastate classification).

enabled services make answering these questions a complex and contentious exercise. The classification of services and the regulatory regime that attaches to such classification normally are important. Voice over IP services, however, require a unique solution because they will compete in the telephone market and competition cannot flourish unless the Commission ensures that the regulatory framework does not disadvantage any competitive providers in the market, especially facilities-based service providers. Accordingly, rather than becoming bogged down in complicated classification debates, the Commission should focus on taking prompt action in two key areas. First, the Commission should adopt a standard framework for IP-based services that are developed or marketed as replacements for traditional telephone service. Second, it should harmonize the regulation of IP-based and non-IP-based voice services, so as to avoid disadvantaging any competitive providers in the telephone marketplace. The Commission should use all of the regulatory tools at its disposal, including Sections 4(i), 10, 201, 202 and 253 of the Act, to establish this basic regulatory regime.

**A. The Commission Should Adopt a Standardized Regulatory Framework for All IP-Based Services that Substitute for Traditional Telephone Service.**

In the 1996 Act, Congress enacted a “pro-competitive, de-regulatory national policy framework designed to accelerate rapidly private sector deployment of advanced telecommunications and information technologies and services to all Americans by opening all telecommunications markets to competition[.]”<sup>19</sup> Through the 1996 Act, Congress intended to promote competition in local telephone markets and, as the Supreme Court recognized in the *Iowa Utilities Board* decision, gave the Commission a mandate to establish a national regime that achieves that objective.<sup>20</sup> To meet the goals of the 1996 Act, the Commission should use

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<sup>19</sup> Telecommunications Act of 1996, Pub. L. No. 104-104, 110 Stats. 56, preamble.

<sup>20</sup> *AT&T v. Iowa Utilities Board*, 525 U.S. 366 (1999).

this proceeding to establish a standardized regulatory framework for all IP-based services that compete in the telephone market.

A critical step in developing the regulatory framework is for the Commission to identify the services that are subject to it. Not all IP-based voice services will compete in the telephone market, and those services that do not do so need not be subject to the same rules. Thus, it is important for the Commission to adopt a simple, straightforward test to address this issue and to give all services that meet the test the critical rights and responsibilities described in Section IV.

Cox submits that there are a few key characteristics that describe IP-enabled services that compete in local telephone markets. They are as follows:

- **The service uses North American Numbering Plan (NANP) resources:** Using telephone numbers is a basic characteristic of telephone service. If a particular service uses NANP numbers to identify its customers or as a way for its customers to reach other parties, then it would meet this test.
- **The service can receive calls from or terminate calls to the PSTN:** Interconnection with the PSTN is another basic characteristic of telephone service. Services that are not interconnected, on the other hand, are much more limited in scope and do not compete directly with traditional telephone service.
- **The service is a plausible replacement for traditional telephone service:** In other words, customers can use the service in the same way that they can use plain old telephone service ("POTS"), to make and receive calls in real time. A service need not have every feature available from POTS to meet this element of the test.<sup>21</sup> Similarly, a service that had features not normally considered elements of POTS would qualify so long as it also provided the basic POTS functionalities.
- **The service uses IP transmission between the service provider and the end user:** This is a critical element of the test. The transmission must run from the provider to an IP terminal adapter or an IP-based telephone set. If the service provider uses IP only for internal transmissions within its network, the service does not meet this element of the test.<sup>22</sup>

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<sup>21</sup> For instance, a service would not need to have a traditional dial tone or to offer optional features such as call waiting to be treated as a plausible substitute. Mobile phones do not have dial tone and increasingly compete with traditional landline service.

<sup>22</sup> See Petition for Declaratory Ruling that AT&T's Phone-to-Phone IP Telephony Services are Exempt from Access Charges, *Order*, WC Docket No. 02-361, FCC 04-97, ¶¶ 12-13 (rel. Apr. 21, 2004).

Any provider that offers services that meet all of the elements of this test should be given the critical rights and obligations described in Section IV. The rights are necessary for a service provider to compete effectively in the local telephone marketplace, and the obligations are necessary to ensure that no provider is given an undue regulatory advantage and that consumers get the basic services they require. For instance, providers that cannot have direct interconnection or collocation with incumbent carriers will incur potentially prohibitive – and unnecessary – costs to exchange traffic with other carriers. Similarly, access to E911 databases is essential to ensuring that customer expectations and public safety obligations are met. By the same token, all providers should be required to contribute to the universal service fund, both to maintain the integrity of the fund and to avoid creating a class of free riders.

The basic regulatory regime should not vary depending on whether a service would qualify as interstate or intrastate in nature. Nor should the rules be different for a provider that invests in its own facilities than for a non-facilities-based service provider. Certainly the Commission should not impose special obligations and costs on a competitive provider of facilities-based IP-enabled services to facilitate the operations of providers that choose not to invest in such facilities. There would be no worse result than a regime that locks in disadvantageous regulation of facilities-based providers or imposes additional obligations on them while giving free rein to companies that ride on the facilities of others.

Adopting a uniform regime also has the advantage of short-circuiting potentially endless debates over whether a particular service falls into one or another of the possible classification “buckets.” IP-based voice services utilize a variety of different and evolving network configurations, and they do not fit neatly into any regulatory classification. Unlike other services, the regulatory classification of voice over IP services will not resolve the regulatory



conundrum. In determining the regulatory treatment of these services, the Commission cannot ignore the fact that they will compete in the telephony market. In the end, these service classification debates obscure the central issue for VoIP, which is how the Commission can best encourage the development of new, advanced IP-enabled services that introduce much needed competition into local telephone markets and benefit all consumers. Adopting a consistent regulatory regime is a much simpler and more direct route to that goal.

**B. The Commission Should Harmonize Regulation of IP-Based and Non-IP-Based Competitive Services.**

The Commission's decisions concerning regulation of IP-based services will not occur in a vacuum. IP-based voice services are entering an existing telecommunications marketplace and will be competing both with ILECs that wield significant market power and with CLECs that have none. The Commission need not attempt to harmonize the regulation of ILECs and IP-based providers (and indeed should not do so, given the ILECs' market power). The ability of voice over IP services to compete in the telephone market, however, requires the Commission to ensure that the regulatory framework does not disadvantage any competitive telephony service provider. Accordingly, the Commission should be careful to avoid disadvantaging CLECs that previously made the necessary risk investments in circuit-switched technology to bring early competition to the market.

This danger will arise if the Commission decides to classify IP-based telephony services as interstate and applies a light regulatory regime to those services without addressing the regulation now imposed on CLECs under state law. This is not an idle concern. There are states, including states where Cox provides service, that continue to impose significant regulatory requirements on CLECs. For instance, in Virginia, Cox is subject to price cap and service quality standard requirements that the FCC would be unlikely to apply to an interstate

service provider. In California, Cox is subject to detailed and costly service quality and consumer protection regulations. In Arizona, Cox is subject to “fair value” regulations that require state commission approval to raise rates above those in approved tariffs, even though Cox has no market power. In Oklahoma, Cox is subject to price caps and must provide cost justification for new offerings and price changes.

These regulatory requirements impose significant costs on the competitive carriers that must comply with them. While Cox made its investments in facilities-based local telephone service with full knowledge of those requirements, it also had the reasonable expectation that it would not be subject to more onerous regulation than its competitors. Companies like Cox that have risked significant investor capital (without any guaranteed return) should not now be put at a regulatory disadvantage against providers that use new technologies to provide a substitute. Such a regime not only would be unfair, but it would discourage the very investment in competitive facilities that the Commission has been trying to encourage since 1999.<sup>23</sup>

To prevent uneven state regulation, the Commission should use all of the tools at its disposal. A joint board could help the states and the Commission identify areas where regulation needs to be harmonized, and Cox supports such cooperative efforts to the extent they can be implemented promptly and effectively. At the same time, the Commission should use its powers under Section 253 and its broad authority to preempt inconsistent state regulation and eliminate state rules that impose a severe competitive disadvantage on those CLECs that do not use IP technology. In particular, Section 253, which gives the Commission the power to preempt state regulation that prevents competition, is an appropriate tool for the Commission to employ when state regulations cripple the CLECs that are squeezed between powerful incumbents on the one

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<sup>23</sup> *UNE Remand Order*, 15 FCC Rcd at 3701, 3757-58.

hand and VoIP providers that enjoy a far more advantageous regulatory framework on the other hand.<sup>24</sup> While the Commission, to date, has not had an occasion to address the scope of Section 253 preemption, it is plain that Congress intended that provision to permit the FCC to address both *per se* and *de facto* barriers to competition. Regulation that creates a significant competitive disadvantage for a certain class of competitive carriers clearly is such a *de facto* barrier. Moreover, prophylactic action by the Commission to eliminate inconsistent state regulation will help to provide certainty and uniformity for existing circuit-switched CLECs and IP-based service providers alike. This certainty is necessary to allow companies and investors to make rational investment decisions as they seek to provide new competition in the telephone market.

**C. The Commission Has the Authority Necessary to Adopt the Appropriate Regulatory Framework.**

Cox does not advocate any particular formula or path for the Commission to follow to implement the regulatory regime described above. As the *Notice* recognizes, there are many tools the Commission can use to create an appropriate regulatory environment.<sup>25</sup> The Commission should not hesitate to use those tools to create a standard set of rules for all new competitors in the telephony marketplace. Moreover, the Commission should not become bogged down in the complexity and controversy of classification issues and thereby foster continued uncertainty in the market, but should instead act quickly to address key questions for all new entrants.

For instance, to the extent that the Commission concludes that IP telephony is a telecommunications service, the Commission can employ its forbearance authority to eliminate any unnecessary regulation of IP-based services.<sup>26</sup> The same authority can be used to eliminate

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<sup>24</sup> 47 U.S.C. § 253(a) (preempting state actions that “have the effect” of prohibiting competition).

<sup>25</sup> *Notice*, ¶¶ 46-49.

<sup>26</sup> 47 U.S.C. § 160(a).

such regulation of traditional CLECs as well. Forbearance is particularly appropriate when a service is in its nascent stages, and overzealous application of regulatory requirements developed for mature services could be fatal.<sup>27</sup> That description applies, of course, to both voice over IP and traditional CLEC services.

By the same token, the Commission could use its authority under Section 4(i) of the Act to extend interconnection and related rights to an IP telephony service that qualifies as an information service, if the IP service substitutes for local exchange service.<sup>28</sup> By exercising forbearance and Section 4(i) authority in tandem, the Commission thereby could ensure that all providers of substitutable local telephone service have the basic rights and obligations needed for them to compete effectively in the market and to meet core public interest needs.

Section 4(i) permits the Commission to take any actions and make any rules “as may be necessary in the execution of its functions.”<sup>29</sup> This provision generally has been interpreted to give the Commission ancillary jurisdiction to adopt certain rules necessary to ensure the fulfillment of its statutory responsibilities with regard to services that Congress has given it explicit authority to regulate. For example, the Supreme Court held that the Commission could exercise ancillary jurisdiction to adopt certain regulations for cable services (before Congress provided it with explicit jurisdiction under the 1984 Cable Act) because such regulation was

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<sup>27</sup> Inquiry Concerning High-Speed Access to the Internet Over Cable and Other Facilities, *Declaratory Ruling and Notice of Proposed Rulemaking*, 17 FCC Rcd 4798, 4847-48 (2002) (“We also believe that forbearance would be in the public interest because cable modem service is still in its early stages; supply and demand are still evolving; and several rival networks providing residential high-speed Internet access are still developing. For these same reasons we tentatively conclude that enforcement of Title II provisions and common carrier regulation is not necessary for the protection of consumers or to ensure that rates are just and reasonable and not unjustly or unreasonably discriminatory.”) See also Policy and Rules Concerning Rates for Competitive Common Carrier Services and Facilities Authorization Therefor, *Fifth Report and Order*, 98 FCC 2d 1191, 1999 (1984) (“Forbearance can reduce the costs and delay of a carrier introducing new services or changing rates. In addition, forbearance facilitates the entry of new carriers to satisfy consumers’ demands faster and at lower rates.”)

<sup>28</sup> 47 U.S.C. § 154(i).

<sup>29</sup> *Id.*

imperative to prevent interference with the Commission's statutory responsibility to regulate in the broadcasting area.<sup>30</sup> Similarly, the Circuit Courts upheld the Commission's exercise of ancillary jurisdiction to regulate ILECs' provision of enhanced services and to create new rights for independent enhanced services providers under the *Computer Inquiries* as necessary to the implementation of the Commission's statutory responsibility to ensure the provision of efficient and economical phone service under Title II.<sup>31</sup>

In this case, the Commission could conclude that services that substitute for traditional telephone service compete directly with Title II services, and that it therefore must adopt rules governing IP telephony to discharge its responsibilities to regulate those Title II services.<sup>32</sup> Further, the Commission could invoke Section 4(i) to adopt rules regarding these services in support of the fulfillment of its obligation under Section 230 "to promote the continued development of Internet-based and other interactive services and media."<sup>33</sup>

At the same time, longstanding Commission precedent under Sections 201 and 202 requires ILECs to provide both information service providers and competing telecommunications carriers with reasonable and nondiscriminatory interconnection.<sup>34</sup> For instance, in the *Expanded Interconnection* proceedings, the Commission concluded that it has the power to require "interconnection in the public interest" even as to non-carriers under Sections 1, 4(i), 201(a) and

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<sup>30</sup> *United States v. Midwest Video Corp.*, 440 U.S. 689, 700, 706-07 (1979).

<sup>31</sup> *GTE Services Corp. v. FCC*, 474 F.2d 724, 730, 732 (2d Cir. 1973); *Computer & Communications Industry Ass'n v. FCC*, 693 F.2d 198, 213 (D.C. Cir. 1982), *cert. denied*, 461 U.S. 938 (1983).

<sup>32</sup> The Commission need not invoke Section 4(i) to make numbering resources available. Section 251(e) gives the Commission "exclusive jurisdiction" over numbering and simply requires numbers to be "available on an equitable basis." 47 U.S.C. § 251(e)(1). Nothing in Section 251(e) precludes assignments to non-carriers.

<sup>33</sup> 47 U.S.C. § 230.

<sup>34</sup> *Expanded Interconnection with Local Telephone Company Facilities, Report and Order and Notice of Proposed Rulemaking*, 7 FCC Rcd 7369, 7470, 7472-73 (1992) ("*Expanded Interconnection Order*"); *Verizon Telephone Services, Order*, 18 FCC Rcd 22737, 22738 (2003) ("...Section 201 collocation. . . is available to other carriers, information service providers, and end users...").

201(b) of the Act.<sup>35</sup> Moreover, the Commission's rules require ILECs to provide both affiliated and unaffiliated information service providers with comparably efficient interconnection.<sup>36</sup> To the extent that the Commission concludes that IP-based voice services competing in the telephone market are information services, it can adopt a similar approach here, expanding its historical requirements to meet the current need and to ensure fair competition. Nothing in the Act or the Commission's precedent precludes this approach.<sup>37</sup>

For example, a voice over IP service that qualifies as a telecommunications service automatically is entitled to interconnection, access to telephone numbers and other rights under Section 251 of the Act.<sup>38</sup> To give the same rights to IP-based telephony providers that qualify only as information services providers, the Commission should exercise its Section 4(i) ancillary jurisdiction to adopt rules to fulfill its Title II responsibilities and its Section 201 and 202 authority to ensure interconnection and non-discriminatory treatment. There is no reason for the Commission to shy away from applying the full arsenal of its statutory powers to develop the appropriate regulatory regime to jumpstart the widespread telephone competition that Congress envisioned when enacting the 1996 Act.

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<sup>35</sup> *Expanded Interconnection Order*, 7 FCC Rcd at 7470, 7472-73.

<sup>36</sup> Amendment of Sections 64.702 of the Commission's Rules and Regulations (Third Computer Inquiry), *Report and Order*, 104 FCC 2d 958, 964-65 (1986); *see also* NYNEX Telephone Cos, *Order*, 11 FCC Rcd 2419, 2419 (1996) ("Under Computer III, a carrier is permitted to provide unregulated, enhanced services if it files a CEI plan demonstrating that the underlying regulated basic services are available on an equivalent basis to unaffiliated enhanced service providers (ESPs)").

<sup>37</sup> In particular, while Section 251 created a new set of interconnection rights, it explicitly did not affect the Commission's existing authority. 47 U.S.C. § 251(i) ("[n]othing in this section shall be construed to limit or otherwise affect the Commission's authority under Section 201."); *AT&T v. Iowa Utilities Bd.*, 525 U.S. 366, 378 (1999).

<sup>38</sup> 47 U.S.C. § 251(a)-(c).

**VI. Conclusion**

For all these reasons, Cox Communications, Inc., respectfully requests that the Commission act in accordance with these comments.

Respectfully submitted,

COX COMMUNICATIONS, INC.

By: 

To-Quyen T. Truong

J.G. Harrington

Its Attorneys

Dow, Lohnes & Albertson, P.L.L.C.  
1200 New Hampshire Avenue, N.W.  
Suite 800  
Washington, D.C. 20036

(202) 776-2000

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# EXHIBIT 1



## WHITEPAPER: Voice over Internet Protocol: Ready for Prime Time

### Cox Communications' Successful Deployment of VoIP

#### DEFINING VoIP

VoIP is a technology — not a service. VoIP technology converts analog voice signals to packets, which are routed as data over an Internet Protocol (IP) network without ever having to rely on traditional circuit-switching. By doing so, the voice conversation does not tie up a dedicated path or channel. With traditional circuit-switching, a dedicated circuit is required. In fact, circuit-switching requires the circuit to remain open until the phone call is terminated.

Packets consisting of voice conversations can be sent over the same path as other data or voice packets. Due to the efficiencies of multiplexing inherent in an IP network, a common infrastructure can carry multiple services, including VoIP-based telephone, along with data and video.

#### FOREWORD

*In February 2003, Cox Communications published “Preparing for the Promise of Voice over Internet Protocol (VoIP),” its first whitepaper on the subject. At that time, VoIP technology was still in its infancy and the need still existed to educate industry analysts and media, as well as our peers, on several fronts, including: the state of VoIP technology and its applications; Cox’s VoIP strategy in relation to the circuit-switched technology Cox has deployed since 1997; the anticipated economics associated with VoIP; and the company’s time-to-market plan.*

*In Cox’s widely published whitepaper, it clearly stated that VoIP held great promise as an upcoming technology, yet it was not quite ready for prime time deployment. Yet, the paper stated, when VoIP is ready for deployment, it would be well-positioned to launch VoIP based on its significant circuit-switched telephone experience. This experience would allow Cox to leverage its telephone back-office operations, network platform and knowledge — without stranding any deployed circuit-switched capital.*

*Since publication of the first whitepaper, Cox continued its thorough approach to developing VoIP technology. During that time, Cox worked very closely with its vendors in the lab and in field trials to drive the technology toward a quality level that Cox deemed suitable for customers. This effort also involved discussions on the regulatory front with the Federal Communications Commission (FCC), the National Cable & Telecommunications Association (NCTA) and various state regulatory agencies to ensure that the regulatory landscape would meet the needs of Cox customers and the business needs of Cox.*

*Cox believes that VoIP is now ready for prime time as a complement to its circuit-switched deployments. This whitepaper will provide an update on Cox’s successful deployment of VoIP technology and the company’s telephone strategy.*

## COX'S MANAGED VoIP VS. INTERNET TELEPHONY

Cox's commitment to customers has driven the development of the VoIP technology that it deploys today and clearly differentiates Cox's VoIP architecture from numerous VoIP technology offerings currently available in the marketplace. There are several compelling advantages to Cox's deployment of VoIP over a private, managed data network rather than the public Internet, including:

**Call Management Control.** Signaling for call set-up and call management is transported as packets on our own backbone data network, never traversing the public Internet.

In contrast, signaling for call set-up and call management for Internet Telephone calls travels through the Internet, a "best-effort" data network that is not engineered to handle voice's stringent requirements. Hence, these "best effort" calls are much more likely to fail during the initial call set-up or inadvertently dropped sometime during the conversation.

**End-to-End Quality of Service (QoS).** On Cox's managed VoIP network, voice packets are labeled and tagged to receive priority treatment and avoid bottlenecks that can cause delays, echoes, drop-outs or other negative impacts on voice quality. By contrast, Internet Telephone calls are transmitted via the public web of networks that comprise the Internet. With Internet Telephony, there is no way to distinguish a voice packet from a data packet. This makes voice packets susceptible to all of the potential problems described above.

In short, Cox's managed VoIP technology delivers the same high-quality phone calls as traditional phone technology, while Internet Telephony call quality may vary based on the amount of data traffic being carried at the time.

**Emergency Services.** Cox's managed VoIP technology enables Enhanced 911 (E-911) service, while some Internet Telephony providers do not. Some Internet Telephony companies provide 911 access – but it is not E-911, where the police or fire department receive the actual phone number and address/location of the calling party and the line stays open even if the calling party hangs up. Cox can accomplish this in Roanoke and in future VoIP deployments because it maintains complete control of its end-to-end managed network infrastructure and back-office functions.

**Open Standards.** Cox's VoIP architecture is compliant with PacketCable™ 1.0 and DOCSIS®, 1.1 standards to ensure quality-of-service levels, while Internet Telephony does not provide quality-of-service guarantees.

## EXECUTIVE SUMMARY

Cox, the 12<sup>th</sup> largest telephone company in the United States, has developed significant telephony infrastructure, operations, expertise and experience during its seven successful years of providing Cox Digital Telephone service, which is now available in 13 markets. Cox's success with circuit-switched technology is evident with more than 1 million satisfied residential customers and more than 100,000 Cox Business Services customer locations. Cox continues to demonstrate strong telephony growth; the company grew its residential telephone customer base by 38 percent in 2003. The fact that Cox is already a major telephone provider clearly distinguishes the company from many of its peers and competitors.

For more than two years, Cox tested and trialed VoIP technology in its laboratories and in field trials. Recently, Cox successfully launched the technology to residential customers in Roanoke, Va., and the company is preparing to launch additional VoIP telephone markets in 2004. Cox's commitment to customers has driven the development of a more robust VoIP technology that clearly differentiates Cox's VoIP architecture from many other VoIP offerings currently available in the marketplace. Regardless of the technology Cox provides — circuit-switched or VoIP — the company is committed to providing high-quality, full-featured telephone service to its customers. Indeed, as the competitive, regulatory and technological environment continues to evolve, Cox will leverage the flexibility it has built into its network to remain a customer-driven, efficient and successful provider in the telephone marketplace.

Based on extensive experience with both circuit-switched and VoIP technology, Cox expects the following distinct advantages as the company expands its telephone footprint with VoIP:

- As a successful telecom provider with solid customer growth in 12 circuit-switched markets and our first VoIP market, Cox will continue to extensively leverage its back-office systems, experienced people and processes for further VoIP market launches.

#### LESSON LEARNED

Cox's decision to use a number of different vendors for its VoIP architecture provided a significant integration challenge. For example, consider the number of equipment types (i.e. softswitch, gateways, CMTSs and MTAs) multiplied by numerous configuration variations multiplied by constantly shifting software versions.

One key to Cox's successful integration testing was the strong stance it took on software version control. By greatly reducing the number of "moving parts" and only allowing new software versions when it was deemed absolutely critical, Cox was able to make continuous progress towards a deployable solution.

- The Cox advantage, in terms of architecture, rests in the fact that it owns and operates its own end-to-end network infrastructure, including a nationwide OC-48 IP backbone network — a key differentiator from Cox's peers and competitors. This allows us to own and manage the complete end-to-end customer experience including sales, provisioning, transport, billing and quality-of-service (see "Architecture Variations" diagram, page 10).
- The regionally distributed architecture provides for an efficient deployment of the technology and its associated back-office operations. It also allows Cox to introduce phone services to customers in markets where the economics do not support the cost of a circuit-switched architecture (see "VoIP vs. Circuit-Switched Cost Comparison," page 11).
- The inherent flexibility already built into Cox's infrastructure will enable the company to remain a successful provider in the highly competitive, ever-changing regulatory world of telecommunications.
- Cox will not abandon its circuit-switched business. Rather, it will leverage the circuit-switched experience to launch new VoIP telephone markets — without stranding the capital it has invested in its circuit-switched operations. Moreover, Cox will have the capability to add capacity in circuit-switched markets via IP transport technology in relation to subscriber growth, when the existing circuit-switch capacity is exhausted.
- Cox will expand its phone service footprint via VoIP to commercial customers, thereby furthering its leadership position in voice among its peers in the commercial telecom marketplace.
- VoIP will help enable the company to reach its goal of providing a three-product bundle of services in all of its markets. Cox also looks forward to the future integration of video, voice and data into a series of unified communications products and services.

## INTRODUCTION

Voice over IP technology has arrived. Cox Communications first launched and marketed it as Cox Digital Telephone in Roanoke, Va. in December 2003 — bringing the same high-quality, full-featured telephone service to residents in Roanoke that it delivers to 12 other Cox telephone markets via circuit-switched technology.

### COX TELEPHONY MARKETS



Cox Digital Telephone service is available to more than 5 million homes in Orange County and San Diego, Calif.; Phoenix and Tucson, Ariz.; Omaha, Neb.; Meriden, Conn.; Rhode Island statewide; New Orleans, La.; Oklahoma City, Okla.; Wichita, Kansas; and Hampton Roads, Roanoke and Northern Virginia. Cox will launch the service in additional markets in 2004.

Both the technical and operational foundations that Cox has deployed today have been for the sole purpose of providing high-quality, full-featured telephone service — a strategy that differentiates Cox from other competitive VoIP telephone providers. More so, as described within this whitepaper, Cox had the foresight to build flexibility into its architecture. As a result, Cox will have the capability to adapt its telephone product, if deemed necessary by competitive, regulatory and/or technological advancements.

With VoIP, voice calls are digitized into Internet Protocol (IP) data packets and transported in that form over Cox's managed IP network. Cox's VoIP solution is based on the technical and operational requirements of an end-to-end, private, managed IP network transport system with full Quality of Service (QoS) that provides telephone service

## VoIP Comparison

	End-to-End Quality of Service	Full Regulatory Compliance (Company)	Interconnect Agreement	PacketCable Compliant	CPE Powering	Automated Provisioning
<b>Cox</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>In-house</b>
<b>Other MSOs</b>	Not yet	No	No	Some	Not yet	Outsource
<b>Internet Telephony Providers</b>	No	Some Providers	Some	Not Applicable	No	Some Providers
	End-to-End Customer Service	Available to Customers Without Broadband	E-911	7 Digit Local Dialing (Where Applicable)	Local Number Portability	
<b>Cox</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	
<b>Other MSOs</b>	<b>Yes</b>	Some	<b>Yes</b>	<b>Yes</b>	Some MSOs	
<b>Internet Telephony Providers</b>	No	No	No	No	Some	

#### **BUILDING AN IP BACKBONE**

Cox Communications decided to internally build and run most of its Internet services, thus eliminating most external dependencies for the delivery of its services. This included the construction of a nationwide IP backbone network.

One of the primary advantages of building a backbone is the ability to reduce data delivery costs via peering. While originally networks must pay to get data to and from the Internet, peering can help reduce or eliminate such costs.

Peering is defined as the exchange of data with other IP networks or ISPs on a settlement-free basis. Cox has been able to ramp up peering to more than 50 percent of its total Internet traffic in just over a year, saving more than half the cost of its transit bill. Peering has the added bonus of reducing latency and, hence, improving network performance for customers.

There are eight main locations for peering in North America: New York, Northern Virginia, Atlanta, Dallas, Chicago, Seattle, the San Francisco Bay Area and Los Angeles. In Cox's case, the backbone extends to most of these cities even though several are not Cox cable franchise areas. It can sometimes feel like a leap of faith adding such locations to your network topology, but it's necessary. Only in that way can you engage in peering relationships that will ultimately save on expenses.

In terms of security requirements, a best-of-breed service provider network requires at least four components: access control, configuration management, attack protection and security policies.

Access control is best defined as "Triple A," or Authentication (verify user), Authorization (determine privileges) and Accounting (track all activities). After reviewing the available tools and feature sets with existing AAA products, Cox's security team decided to build a more comprehensive solution using a combination of open-source and productized tools.

Attack protection was accomplished via a variety of methods, including firewalls, Intrusion Detection Systems (IDS), Access Control Lists (ACLs) and anti-Denial-of-Service (DoS) tools. Firewall and IDS boxes were installed at each regional data center location to protect distributed telemetry and provisioning servers, while every router interface is configured with ACLs to protect critical networks. Cox deployed a DoS protection system, which collects data (i.e., traffic samples from all routers) in order to detect attacks and provide trend analysis.

*Continued on page 6*

with enhanced 911 services, directory assistance, operator services, local phone number portability, equal access long distance and compliance with CALEA (Communications Assistance for Law Enforcement Act). This product direction is based on significant market research and Cox's proven success in providing a quality telephone solution.

## **COX'S EARLY ENTRY INTO TELEPHONE**

No discussion of Cox's success with VoIP can start without first exploring the company's success as a circuit-switched telecom provider. Cox has grown from a single-service cable television company into a multi-service broadband communications provider. Via its flexible and powerful broadband delivery network, Cox now offers a number of communications and entertainment services, including analog and digital cable television, high-speed Internet, telephone and high-definition television in most of its residential and commercial markets. Cox has not only leveraged the power of its broadband platform to create multiple revenue streams, but has also created more profitable, longer-term customer relationships by offering bundled services to customers. Cox customers continually validate the company's strategies, as evidenced by the impressive growth of these new services.

Cox's telephone business, in particular, has distinguished the company from its peers. In the mid 1990s, Cox began installing switches and other telecom equipment in select markets, preparing to capitalize on the Telecommunications Act of 1996 which officially opened the telecom market to competition. Cox first launched local phone service in 1997 in Orange County, Calif. Today, Cox Digital Telephone has more than 1 million residential customers and more than 100,000 Cox Business Services customer locations across 13 telephone markets. In 2003, Cox received the highest honor in J.D. Power and Associates' 2003 Residential Local Telephone Customer Satisfaction Study in the Western Region.

"Cox pioneered cable telephone via circuit-switched technology," notes Chris Bowick, Cox's Chief Technical Officer. "In doing so, we amassed more than seven years of in-the-trenches experience as a telecom provider.

*"Building an IP Backbone," continued*

Finally, security policies were written to provide a baseline for continued network security. Operational guidelines, such as password management and DoS attack response procedures are covered, as well as restrictions on what sorts of protocols may be used for any given type of service or access. One valuable lesson learned was that a single comprehensive policy facilitates more widespread adherence than several topic-specific policy documents.

**Services**

Cox's backbone has, to date, far exceeded expectations. Performance has been excellent and peering (as well as competitively bidding transport and transit services) has helped us to reduce backbone costs.

On top of that, the backbone is beginning to be used as a strategic asset that can be applied toward other parts of the business. One of the first applications to take advantage of the backbone was Cox's own internal network, used for Cox's business needs (e-mail, billing, customer care, etc.). Most of this network has migrated over to our IP backbone from a leased frame relay network, saving millions of dollars in recurring expenses.

Cox is also beginning to use its own network to transport its long-distance telephone traffic. As the nation's 12th-largest telephone company and with 75 percent of the residential phone customers taking Cox's long distance offering, Cox purchases significant amounts of wholesale long distance minutes from third parties.

The company realized that a significant portion of these calls terminate in other markets where Cox either offers phone service or where the backbone terminates. By converting calls to VoIP and then transmitting these calls over Cox's IP backbone, the company is realizing cost savings totaling millions of dollars in expenses.

Lastly, as Cox launches VoIP services over the coming years, the IP backbone is perfectly suited to act as the transport mechanism for both telephone calls and call-control protocols. One of the keys to VoIP's success will be the ability to geographically distribute and share the assets necessary for running the service. The backbone is ideally suited to act as the glue that connects those assets together. Eventually, Cox will be able to interoperate between this "Class 5" infrastructure and the "Class 4" long-distance infrastructure mentioned above.

*Continued on page 7*

We navigated the complexities of the business, built a tremendous technological and operational base on which to distribute phone service and have already delivered significant financial results. Above all, we proved to both residential and commercial customers that they can depend on Cox for their phone services — for multiple services, in fact."

Cox attributes much of its success with launching VoIP technology to its pragmatic approach. "We reached the point where VoIP technology made good business sense from a technical, financial and operational perspective," said Bowick. "Today, the technology is robust and reliable and it integrates seamlessly with our circuit-switched operations. Importantly, we were not forced to abandon our circuit-switched technology in favor of VoIP because the two technologies are complementary. Cox's telephony strategy is a win-win scenario, one in which we control our destiny and our customers experience, thanks to our end-to-end managed network infrastructure and back-office functions, as well as our tremendous base of telephone expertise."

## MAXIMIZING ALL OF THE PIECES

Key elements of Cox Digital Telephone with a VoIP architecture include:

- **Network** — Cox attributes much of its success to its powerful network. Over the past decade, the company has extensively upgraded the HFC network in its local markets to deliver a very high capacity, reliable and extremely flexible platform on which to layer advanced services. Presently, more than 92 percent of the company's homes-passed are at least 750Mhz and two-way activated. With fiber optic nodes serving an average of less than 700 homes passed, Cox continues to effectively manage spectrum for ample capacity for all of the services it delivers now and for future growth.
- **Back-office** — Just as important as the power of the network is the complex system of back-office functions and processes that must be perfected in order to effectively deliver telephone services. These



*"Building an IP Backbone," continued*

Enabling an IP backbone to accommodate the delivery of multiple services does not come without considerable preparation and testing, as well as the work involved with activation of advanced protocols. In Cox's case, quality of service (QoS) is implemented in core routers via DiffServ and TOS (type of service) bits, as well as by marking and remarking as appropriate all data that enters the backbone. Cox has created levels of priority-setting properties, such as packet-drop, packet delay and delay jitter. Cox has also activated the MPLS protocol for traffic engineering purposes.

Just as Cox has for years referred to hybrid fiber/coax (HFC) as the "winning network," the company has gained an appreciation for the importance and value of its IP backbone as another powerful tool for delivering services to customers. By keeping this asset under Cox's own control, the company has been able to easily evolve the network to meet current and future needs without dependencies on outside partners. And due to the efficiencies of multiplexing inherent in an IP network, Cox is able to achieve significant cost savings by sharing a common infrastructure for multiple services.

For further information on building Cox's IP backbone, visit <http://www.cedmagazine.com/ced/2004/0204/02c.htm>

functions include call processing, enhanced 911 services, billing, phone number administration, local number portability, operator services, directory assistance, directory listings, interexchange agreements with other phone companies, calling cards and numerous other requirements. For many years, Cox has dedicated teams exclusively to perfecting support and delivery processes for telephone service. These teams develop methods, procedures, audit processes and measurements that impose discipline and efficiency on the delivery and support of all of video, voice and data services.

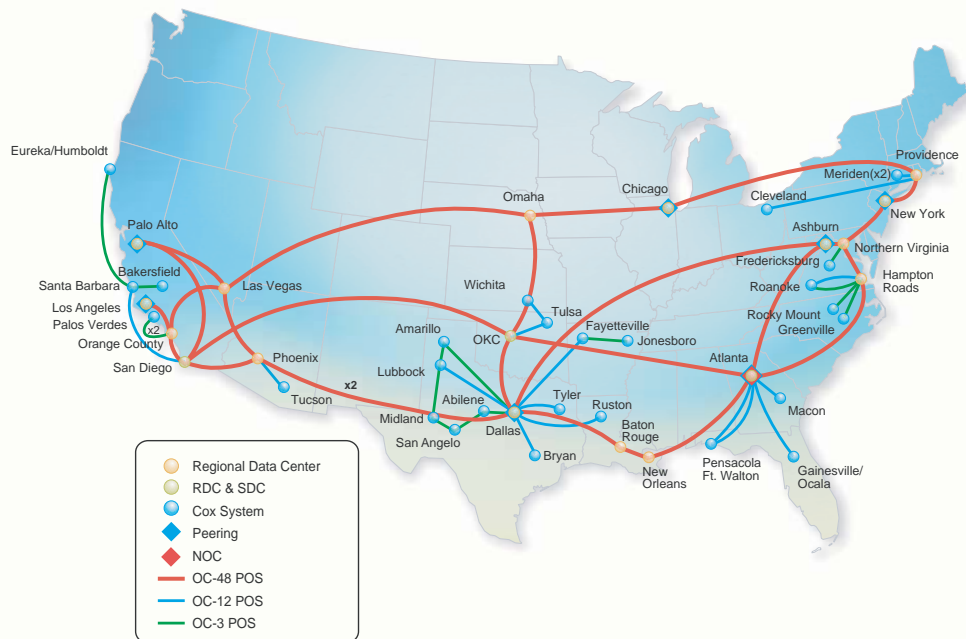
Indeed, Cox's back-office systems and processes are leveraged extensively for VoIP roll-outs. Thereby, Cox did not have an extensive learning curve for its first VoIP launch. Cox already had the processes and experienced people in place to provision services, manage data and integrate information about multiple services into one central location. This provides extraordinary value that Cox continues to reap every day.

A key asset is Cox's ability to manage the back-office functions of delivering phone service with its integrated customer management system. Cox is the only major broadband company that operates 100 percent of its field locations and all of its video, voice and data services on a single back-office platform. The vast capabilities of this system help provide a smooth experience for Cox customers at all stages of the relationship. Cox's system ensures seamless flow of functions, including order entry, scheduling, installation, billing and service provisioning. The value of this integration is extraordinary, allowing Cox customer care representatives to sell efficiently and activate all services utilizing a single platform at one time with one phone call and one view of all relevant customer data. Cox is also able to offer customers the flexibility of receiving one billing statement for multiple services, choosing a single bill for each or selecting a combination of those options. Lastly, the back-office integration supports a high degree of flexibility and automation, eliminating paper and manual processes that erode margins, cause errors and lead to customer dissatisfaction. Moreover, it eliminates the need to coordinate with third party companies, which can lead to delays in activating and servicing customers.

- **Backbone** — Cox's nationwide OC-48 IP backbone network was created in 2001. Today it transports Cox High Speed Internet, Cox Business Internet services, VoIP and more than 25 percent of Cox's long distance traffic.

The backbone interconnects all Cox markets and connects other major metropolitan hubs including Chicago, Dallas, Los Angeles, San Francisco and New York. This extremely flexible and powerful network includes 14 regional data centers (RDCs) and three services data centers (SDCs). The SDCs serve as hosting locations for VoIP soft-switch technology for nationwide telephony coverage in addition to hosting and sharing mail, news, web space and other components of Cox High Speed Internet. These centers provide Cox with a national presence well beyond the local-only networks typical in the cable business and an attractive economic foundation for significant geographic efficiencies enabled by the network. Instead of replicating

### Cox High Speed Internet Backbone





equipment in every data or VoIP market, Cox regionalizes some components of service delivery into these centers. This architecture enables Cox to further leverage its backbone to integrate data and telephony services.

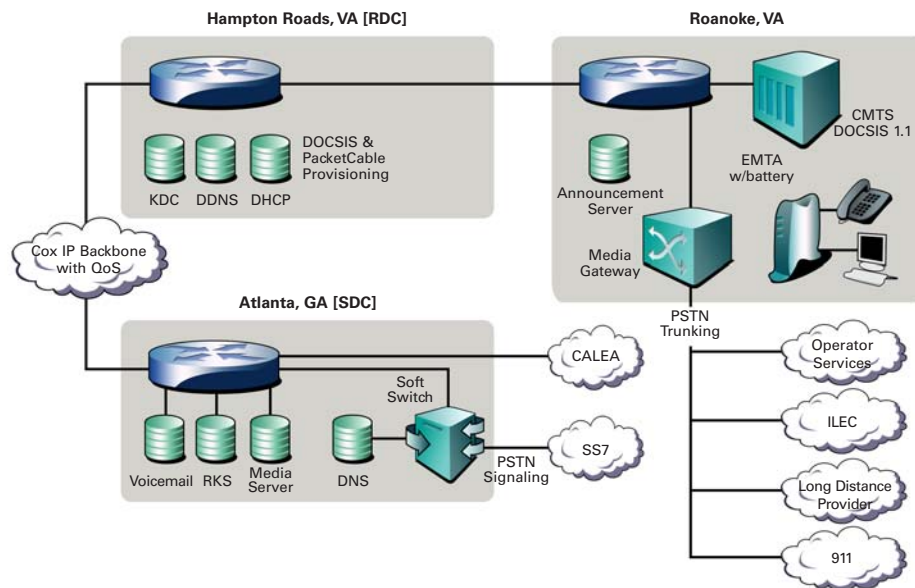
## COX'S VoIP ARCHITECTURE

Cox's architecture is PacketCable™ compliant and purpose-built to provide nothing less than high-quality, full-featured telephone service. The network's primary components include DOCSIS 1.1 cable modem termination systems (CMTSs), media terminal adapters (MTAs), media gateways and a soft switch.

The highly distributed nature of Cox's VoIP architecture creates numerous leverage points throughout the network. The ability to leverage local, regional and national infrastructure, as well as processes and procedures, enables the operation to efficiently scale in size and scope.

**Local.** The media gateway and CMTS reside at the local (metro) network level. The existing CMTS equipment provides a key infrastructure leverage

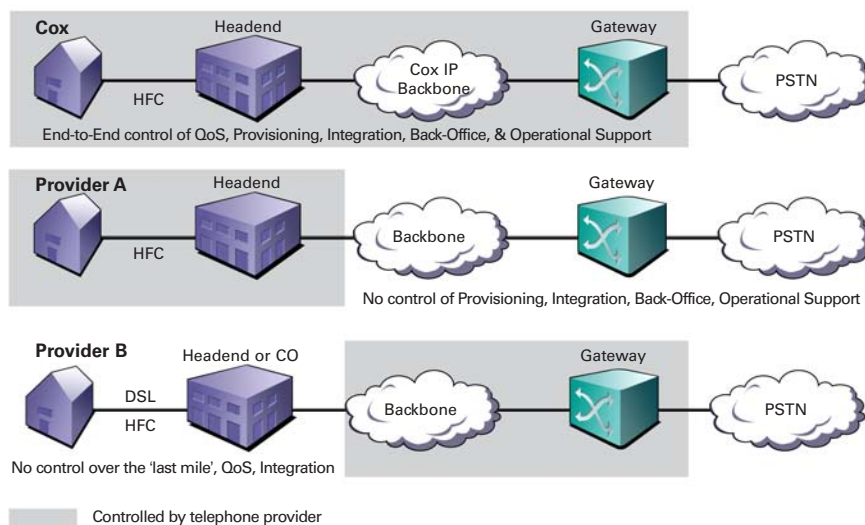
### Cox VoIP Architecture



point since it is already deployed to support Cox High Speed Internet services. In addition, many of the back-office functions typically performed locally in decentralized circuit-switched markets are consolidated at the regional level, thereby eliminating the need to replicate operations groups for newly launched markets.

**Regional.** The Dynamic Host Configuration Protocol (DHCP), Domain Name Server (DNS) and provisioning functions are located at the regional level. In the traditional circuit-switched model, Cox's local markets maintain responsibility for many of the back-office functions. However, Cox's regional design enables the consolidation of many back-office functions, including directory assistance, E-911 and local number portability. "The regional back-office support structure can support multiple markets," said Bowick. "As a result, Cox has realized true efficiency gains by eliminating the need to train and staff employees for local telephone operations. This creates downward pressure on what is typically a steep learning curve, given the complex nature of the telephony business."

### Architecture Variations



**National.** The soft switch resides at the national level of the architecture. The technical expertise required to support the soft switch is also maintained at this level, thereby creating a centralized technical

**Per Customer Cost Comparison:  
VoIP vs. Circuit-Switched<sup>1</sup>**

	VoIP	Circuit-Switched
<b>Telephone Cost</b>		
MTA/NIU	\$130 <sup>2</sup>	\$215
Switch	\$86	\$83
HIT	–	\$53
<b>Subtotal</b>	<b>\$216</b>	<b>\$351</b>
<b>Network Readiness Cost<sup>3</sup></b>		
Drop/Connect	\$30	\$85
Powering/Status Monitoring <sup>4</sup>	\$21	\$91
<b>Total</b>	<b>\$267</b>	<b>\$527</b>

1 Figures reflect current values at the time of publication. Given the dynamic nature of the marketplace, further maturation of VoIP technology will likely contribute to rapid decreases in VoIP costs. Price decreases will likely be seen in mature circuit-switched costs as well, albeit not as rapid as VoIP.

2 Includes the cost of an embedded cable modem.

3 Some published cost analyses may not include these factors as allocated costs for VoIP.

4 Based on 20% penetration.

support structure. With this configuration, Cox's local markets do not have to develop the technical expertise necessary to support the soft switch. More so, the ability to have a single view of the whole network to facilitate efficient troubleshooting techniques and problem resolution is the true benefit of centralizing knowledge of the entire system architecture and diagnostics. Moreover, a single group within the Cox organization maintains secure, controlled access to the soft switch to produce inherent quality control.

## THE ECONOMICS OF VoIP

Cox anticipates the cost of VoIP technology will continue to improve over time, much more rapidly than circuit-switched costs. Any comparison of the cost of VoIP versus circuit-switched should be done by evaluating similar telephone service components, including:

### **CPE, Switching and other Peripheral Headend/MTC Equipment.**

In these telephone-specific costs alone, VoIP potentially offers a capex advantage of almost 40 percent per customer when compared to an equivalent circuit-switched primary line replacement service. This significant cost advantage can largely be attributed to the lower cost of the MTA versus the NIU. Also, VoIP does not require the equivalent of a dedicated Headend Interface Terminal (HIT) for interface between the network and the switch. Instead, Cox's VoIP technology leverages the existing CMTS to support Cox's high-speed Internet platform. Further cost advantages for VoIP could be realized if Cox customers purchased the embedded MTA at retail locations (similar to the DOCSIS model) or if Cox provided a non-embedded MTA (one without a DOCSIS modem) to customers that already own a cable modem.

**Network Readiness.** Additional plant-related capex costs that could be attributed, at least partially, to the deployment of VoIP or circuit-switched telephone service include activities such as minor drop replacement and capitalized connect costs (to connect the NIU or MTA to the inside whole-house telephone wiring) and improved plant status monitoring and standby power. Regardless of VoIP, most of these activities would still be accomplished over time. In addition, these activities improve service quality and reliability for all of Cox's products – not just

telephone service. In these cost models, Cox assumes at least four hours of standby power in the HFC plant for both technologies, with in-home battery back-up for the VoIP MTA and network-supplied power for the circuit-switched NIU. Inclusion of these costs in the analysis will increase VoIP's per customer cost advantage to approximately 50 percent when compared to circuit-switched technology.

Cox has regionalized many of the functions and much of the equipment associated with delivering Cox High Speed Internet and VoIP, spreading the costs across multiple markets for savings and efficiencies. The following factors also contribute to the efficiency of its VoIP architecture:

- **Regional and National Scalability** — Cox's distributed VoIP architecture will drive savings in both operational and capital expense when compared to circuit-switched telephone. For instance, circuit switches are usually geographically restricted based on serving distance; therefore installed and maintained within each local circuit-switched market. With VoIP technology, Cox installs and maintains soft switches at the national level, serving multiple markets with only limited equipment and operations required locally. Current long-term plans are to deploy soft switches in three locations to serve all Cox markets. For Cox, this is particularly beneficial in smaller markets, where the potential customer base doesn't justify the cost of a circuit switch and associated infrastructure. This regional approach to scalability will also help the company defray the significant up-front investment in personnel and recoup its capital investment faster.
- **Quality of Service (QoS)** — Cox is complete in its upgrade to DOCSIS 1.1 software on its cable modem termination systems, a prerequisite for QoS. Cox believes that QoS is a requirement for providing high-quality, full-featured service and to prevent packets from suffering degradation during peak traffic periods or other periods of network congestion. Overall, Cox believes that end-to-end QoS also reduces operating costs by minimizing the number of customers who otherwise would be unsatisfied with the quality of their service. Cox's end-to-end QoS control is yet another inherent advantage of owning and controlling its network.

- Powering — Cox's research has found that consumers are more likely to choose a telephone service with power back-up than one without, thereby contributing to higher penetration rates. In Roanoke, Cox currently provides back-up powering of the in-home multimedia terminal adapter (MTA) using an internal battery that supplies several hours of back-up service. In the future, should market conditions and research indicate the need, Cox has the flexibility to provide customers with the option of taking telephone service without battery back-up for the MTA.

## MARKETING VoIP

Cox has long enjoyed excellent relationships with its customers, which the company accurately predicted would translate into customer loyalty. According to Cox research, customer churn in two-product households is 18 percent lower than one-product, while three-product customer churn is 48 percent lower.

Cox's belief is simple: Prove to customers that you're capable of delivering traditional cable service and high-speed Internet efficiently and with high value. Without this, they'll never trust you to deliver high-quality, full-featured phone service. Many companies seem to underestimate the critical importance of this fact. It's one thing to have a network and technology in place, but entirely different and more difficult to also possess the know-how and track record of actually serving customers' many needs effectively. Indeed, Cox received the highest honor in J.D. Power and Associates' 2003 Residential Local Telephone Customer Satisfaction Study in the Western Region.

In marketing VoIP, it's important to remember that VoIP is an architecture — not a product. Company research shows that most customers are not interested in the technology behind their telephone service, so Cox prefers to focus on the benefits and features that customers truly care about, such as value, bundled savings, convenience, rich features and attractive packages.

In Roanoke, the company positions, packages and prices its VoIP technology as high-quality, full-featured residential telephone service, branded as Cox Digital Telephone and sold in an identical fashion as in Cox's switched telephony markets. Cox's marketing strategy and tactics used in Roanoke are similar to the successful approach used in markets where a circuit-switched telephone architecture was implemented. In contrast to Internet Telephony, a subscription to Cox's high-speed Internet service is not necessary to receive telephone service served by Cox's VoIP architecture. This enables Cox to serve voice customers who do not wish to subscribe to Internet service.

## CONCLUSION

The inherent flexibility of Cox's end-to-end network infrastructure, from the CPE to transport and back-office functions, as described in this whitepaper, will enable Cox to remain a successful provider in the highly-competitive and uncertain regulatory world of telecommunications and to readily adapt and expand its telephone operations into new markets and to more customers.

In summary, Cox foresees the following:

- VoIP technology permits efficient geographic expansion of Cox's phone services, allowing the company to launch telephony in markets where the economics didn't justify the cost of a circuit-switched architecture. The company will launch several new Cox Digital Telephone markets utilizing VoIP in 2004.
- Cox will expand its phone service footprint via VoIP to commercial customers, thereby furthering its leadership position in voice among its peers in the commercial telecom marketplace.
- Cox's VoIP architecture provides the flexibility to expand service in existing circuit-switched phone markets with either a circuit-switched-only approach, or with a complementary VoIP overlay (once existing circuit-switch capacity is fully exhausted).

- VoIP technology enables Cox to introduce phone services to customers the company isn't currently reaching, without stranding the capital it has invested in its circuit-switched operations. The company will not abandon its circuit-switched business. Cox will completely utilize the capacity of existing switches.
- VoIP technology enables Cox to deliver long distance (LD) traffic over its own IP backbone network. Currently, more than 25 percent of Cox's long distance customer calls are transported via the company's national backbone, reducing its reliance on third-party wholesale LD providers.
- VoIP provides an economically efficient method to provide high-quality telephone service in Cox markets, enabling the company to reach its goal of providing a three-product bundle of services in all of its markets.
- Regulatory agencies are only now beginning to examine appropriate treatment of VoIP technology. To date, it is not yet known how the technology will ultimately be classified. New and varied approaches to VoIP by traditional telephony providers and new market entrants further complicate the regulatory environment. Notwithstanding, Cox's flexible VoIP architecture and back-office infrastructure will continue to position the company well and enable Cox to adapt quickly and as necessary to this dynamic environment.

"As the leading provider of cable telephony services, we take great pleasure in the growth of our telephone customer base," said Bowick. "We've proven that cable providers can be successful as telephone providers and we look forward to continuing our leadership position by offering the service to a broader segment of our customer base in 2004."